

What is claimed is:

1. A method of preparing a bone xenograft for implantation into a human, which comprises

5 a. removing at least a portion of a bone from a non-human animal to provide a xenograft;

b. washing the xenograft in water and alcohol;

c. subjecting the xenograft to a cellular disruption treatment; and

d. digesting the xenograft with a glycosidase to remove substantially a

10 plurality of first surface carbohydrate moieties from the xenograft, wherein the glycosidase has a concentration in a range of about 1 mU/ml to about 1000 U/ml, and

15 whereby the xenograft has substantially the same mechanical properties as a corresponding portion of a native bone.

15 2. The method of claim 1, further comprising the step of: subsequent to the glycosidase digesting step, treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of capping molecules to cap at least a portion of the second surface carbohydrate moieties,

20 whereby the xenograft is substantially non-immunogenic.

25 3. The method of claim 2, wherein the capping step comprises treating the second surface carbohydrate moieties on the xenograft with the capping molecules having a concentration in a range of about 0.1 mM to about 100 mM.

4. The method of claim 2, wherein at least a portion of the capping molecules are sialic acid molecules.

30 5. The method of claim 1, wherein the glycosidase is a galactosidase.

6. The method of claim 5, wherein the galactosidase is an α -galactosidase.

7. The method of claim 1, wherein the cellular disruption treatment comprises freeze/thaw cycling.

5 8. The method of claim 1, wherein the cellular disruption treatment comprises exposure to gamma radiation.

9. The method of claim 1 further comprising the step of following step c, exposing the xenograft to a crosslinking agent in a vapor form.

10 10. The method of claim 1 further comprising the step of following step c, treating the xenograft with a demineralization agent to remove substantially minerals from an extracellular matrix.

15 11. The method of claim 1 further comprising the step of following step c, adding an osteoinductive factor to the xenograft.

12. The method of claim 1 further comprising the step of following step c, adding a binding agent to the xenograft.

20 13. A method of preparing a bone xenograft for implantation into a human, which comprises

Sub A2 ~~a. removing at least a portion of a bone from a non-human animal to provide a xenograft;~~

25 ~~b. washing the xenograft in water and alcohol;~~

~~c. subjecting the xenograft to a cellular disruption treatment;~~

~~d. digesting the xenograft with a glycosidase to remove substantially a plurality of first surface carbohydrate moieties from the xenograft; and~~

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e. treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of sialic acid molecules to cap at least a portion of the second surface carbohydrate moieties,
whereby the xenograft is substantially non-immunogenic and has substantially the same mechanical properties as a corresponding portion of a native bone.

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14. The method of claim 13, wherein the capping step comprises treating the second surface carbohydrate moieties on the xenograft with the sialic acid molecules having a concentration in a range of about .01 mM to about 100
10 mM.

15. The method of claim 13, wherein at least the glycosidase is a galactosidase.

16. The method of claim 15, wherein at least the galactosidase is an α -galactosidase.
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17. The method of claim 13, wherein the cellular disruption treatment comprises freeze/thaw cycling.

20 18. The method of claim 13, wherein the cellular disruption treatment comprises exposure to gamma radiation.

19. The method of claim 13 further comprising the step of following step c, exposing the xenograft to a crosslinking agent in a vapor
25 form.

20. The method of claim 13 further comprising the step of following step c, treating the xenograft with a demineralization agent to remove substantially minerals from an extracellular matrix.
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21. The method of claim 13 further comprising the step of following step c, adding an osteoinductive factor to the xenograft.

22. The method of claim 13 further comprising the step of following step c, adding a binding agent to the xenograft.

23. An article of manufacture comprising a substantially non-immunogenic knee bone xenograft for implantation in to a human, produced by

5 a. removing at least a portion of a bone from a non-human animal to provide a xenograft;

10 b. washing the xenograft in water and alcohol;

c. subjecting the xenograft to a cellular disruption treatment; and

d. digesting the xenograft with a glycosidase to remove substantially a plurality of first surface carbohydrate moieties from the xenograft, wherein the glycosidase has a concentration in a range of about 1 mU/ml to about 1000 U/ml, and whereby the xenograft has substantially the same mechanical properties as a

15 corresponding portion of a native bone.

24. The article of manufacture of claim 23, further produced by subsequent to the glycosidase digesting step, treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of capping molecules to cap at least a portion of the second surface carbohydrate moieties on the xenograft, whereby the xenograft is substantially non-immunogenic.

25. The article of manufacture of claim 24, wherein the capping molecules have a concentration in a range of about .01 mM to about 100 mM.

26. The article of manufacture of claim 24, wherein at least a portion of the capping molecules are sialic acid molecules.

27. The article of manufacture of claim 23, wherein the glycosidase is a

30 galactosidase.

28. The article of manufacture of claim 27, wherein the galactosidase is an α -galactosidase.

29. The article of manufacture of claim 23, wherein the cellular disruption treatment comprises freeze/thaw cycling.

30. The article of manufacture of claim 23, wherein the cellular disruption treatment comprises exposure to gamma radiation.

10 31. The article of manufacture of claim 23 further comprising the step of following step c, exposing the xenograft to a crosslinking agent in a vapor form.

15 32. The article of manufacture of claim 23 further comprising the step of following step c, treating the xenograft with a demineralization agent to remove substantially minerals from an extracellular matrix.

20 33. The article of manufacture of claim 23 further comprising the step of following step c, adding an osteoinductive factor to the xenograft.

34. The article of manufacture of claim 23 further comprising the step of following step c, adding a binding agent to the xenograft.

25 35. An article of manufacture comprising a substantially non-immunogenic knee bone xenograft for implantation in to a human, produced by

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a. removing at least a portion of a bone from a non-human animal to provide a xenograft;

b. washing the xenograft in water and alcohol;

c. subjecting the xenograft to a cellular disruption treatment;

30 d. digesting the xenograft with a glycosidase to remove substantially a plurality of first surface carbohydrate moieties from the xenograft; and

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e. treating a plurality of second surface carbohydrate moieties on the xenograft with a plurality of sialic acid molecules to cap at least a portion of the second surface carbohydrate moieties,
whereby the xenograft is substantially non-immunogenic and has substantially the same mechanical properties as a corresponding portion of a native bone.

36. The article of manufacture of claim 35, wherein the sialic acid molecules have a concentration in a range of about .01 mM to about 100 mM.

10 37. The article of manufacture of claim 35, wherein the glycosidase is a galactosidase.

38. The article of manufacture of claim 37, wherein the galactosidase is an α -galactosidase.

15 39. The article of manufacture of claim 35, wherein the cellular disruption treatment comprises freeze/thaw cycling.

40. The article of manufacture of claim 35, wherein the cellular disruption treatment comprises exposure to gamma radiation.

20 41. The article of manufacture of claim 35 further comprising the step of following step c, exposing the xenograft to a crosslinking agent in a vapor form.

25 42. The article of manufacture of claim 35 further comprising the step of following step c, treating the xenograft with a demineralization agent to remove substantially minerals from an extracellular matrix.

30 43. The article of manufacture of claim 35 further comprising the step of following step c, adding an osteoinductive factor to the xenograft.

44. The article of manufacture of claim 35 further comprising the step of following step c, adding a binding agent to the xenograft.

45. A bone xenograft for implantation into a human comprising
5 a portion of a bone from a non-human animal, wherein the portion includes an extracellular matrix and a plurality of substantially only dead cells, the extracellular matrix and the dead cells having substantially no surface α -galactosyl moieties and having a plurality of sialic acid molecules linked to at least a portion of a plurality of surface carbohydrate moieties on the xenograft,
10 whereby the portion of the bone is substantially non-immunogenic and has substantially the same mechanical properties as a corresponding portion of a native bone.

46. The bone xenograft of claim 45, wherein the portion of the bone has
15 substantially no minerals.

47. The bone xenograft of claim 45, wherein the portion has an osteoinductive factor implanted in an extracellular matrix.

20 48. The bone xenograft of claim 45, wherein the portion has a binding agent implanted in an extracellular matrix.